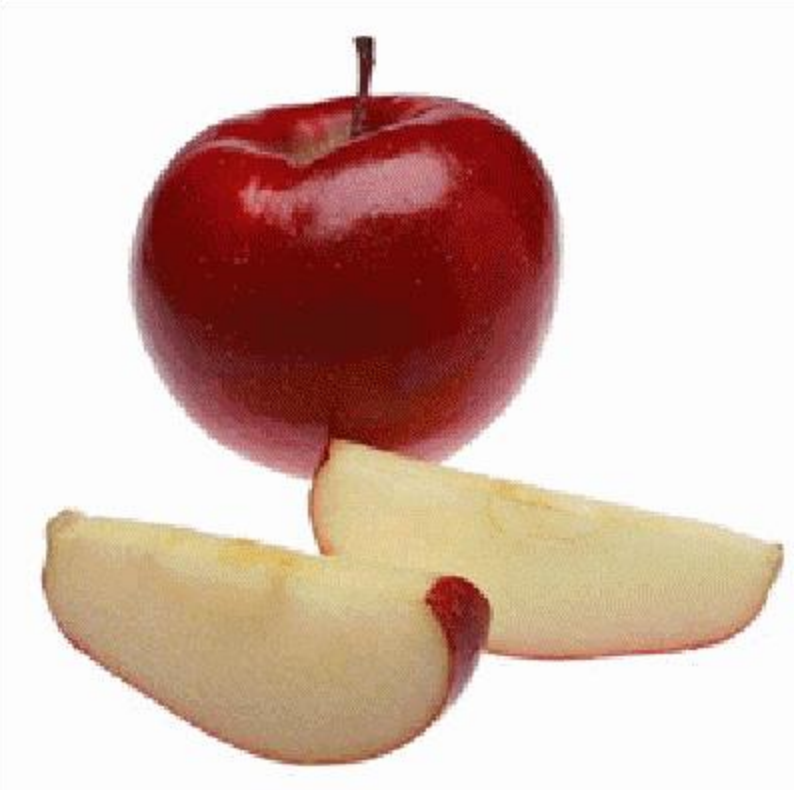
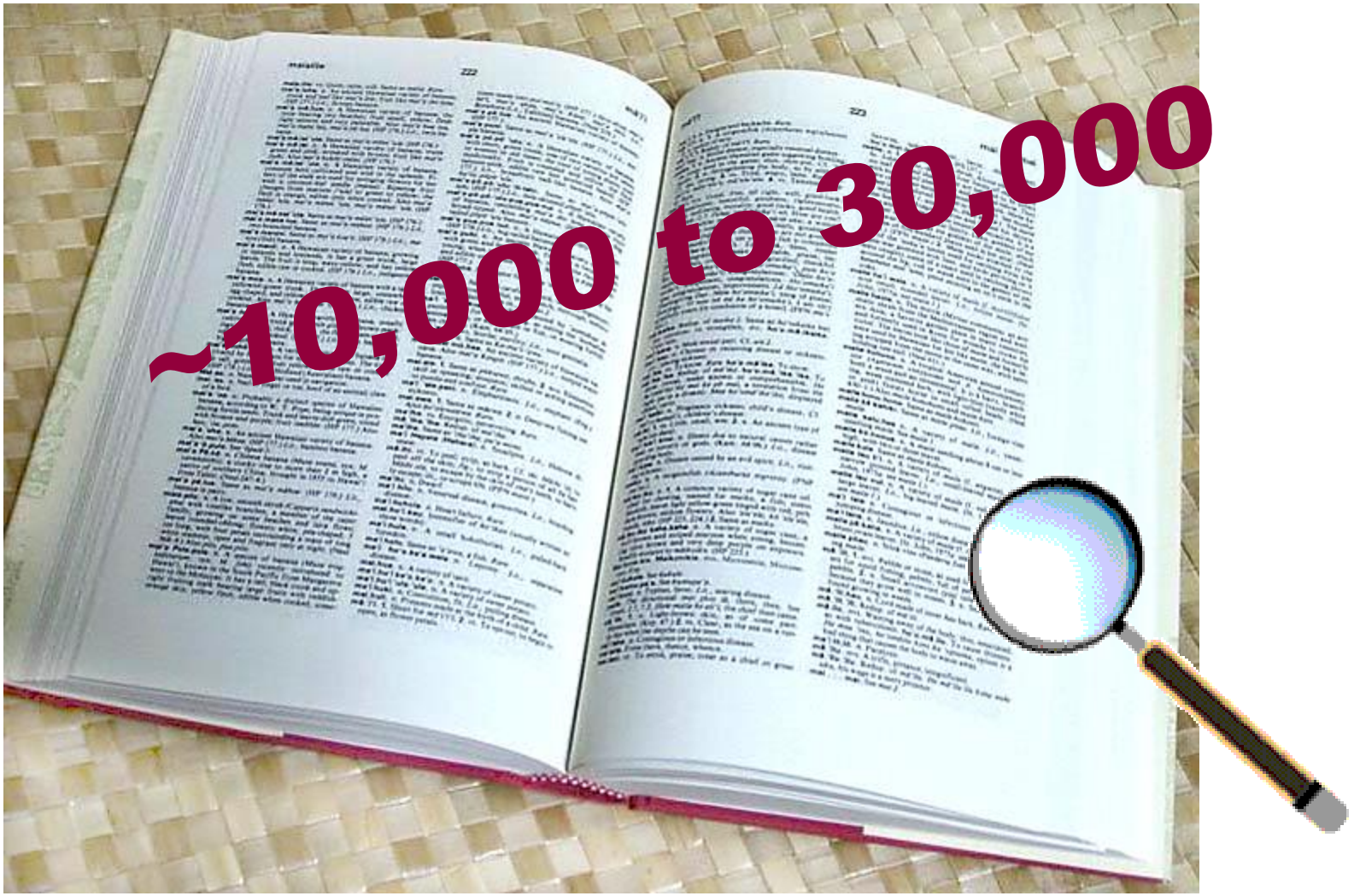
Object Recognition



How many object categories are there?



Biederman 1987

Bruegel, 1564

Dictionary.com

object

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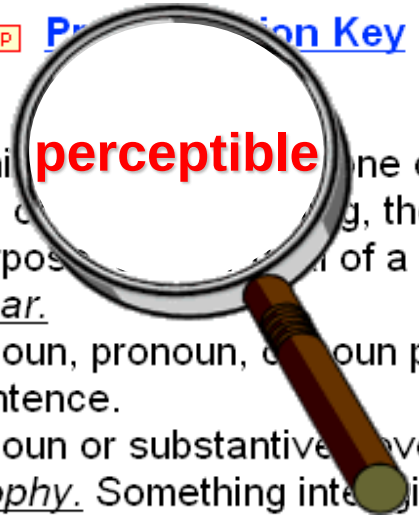
ob·ject P Pr…on Key (ŏb'jĭkt, -jĕkt')

n.

1. Somethi… one or more of the senses, especia… or touch; a…
2. A focus … g, thought, or action: *an object of co…*
3. The purpos… of a specific action or effort: *the object … game.*
4. *Grammar.*
   a. A noun, pronoun, … oun phrase that receives or is affected by the a…ion of a ve… within a sentence.
   b. A noun or substantive … verned by a preposition.
5. *Philosophy.* Something inte…gible or perceptible by the mind.
6. *Computer Science.* A discrete item that can be selected and maneuvered, such as an onscreen graphic. In object-oriented programming, objects include data and the procedures necessary to operate on that data.



So what does object recognition involve?

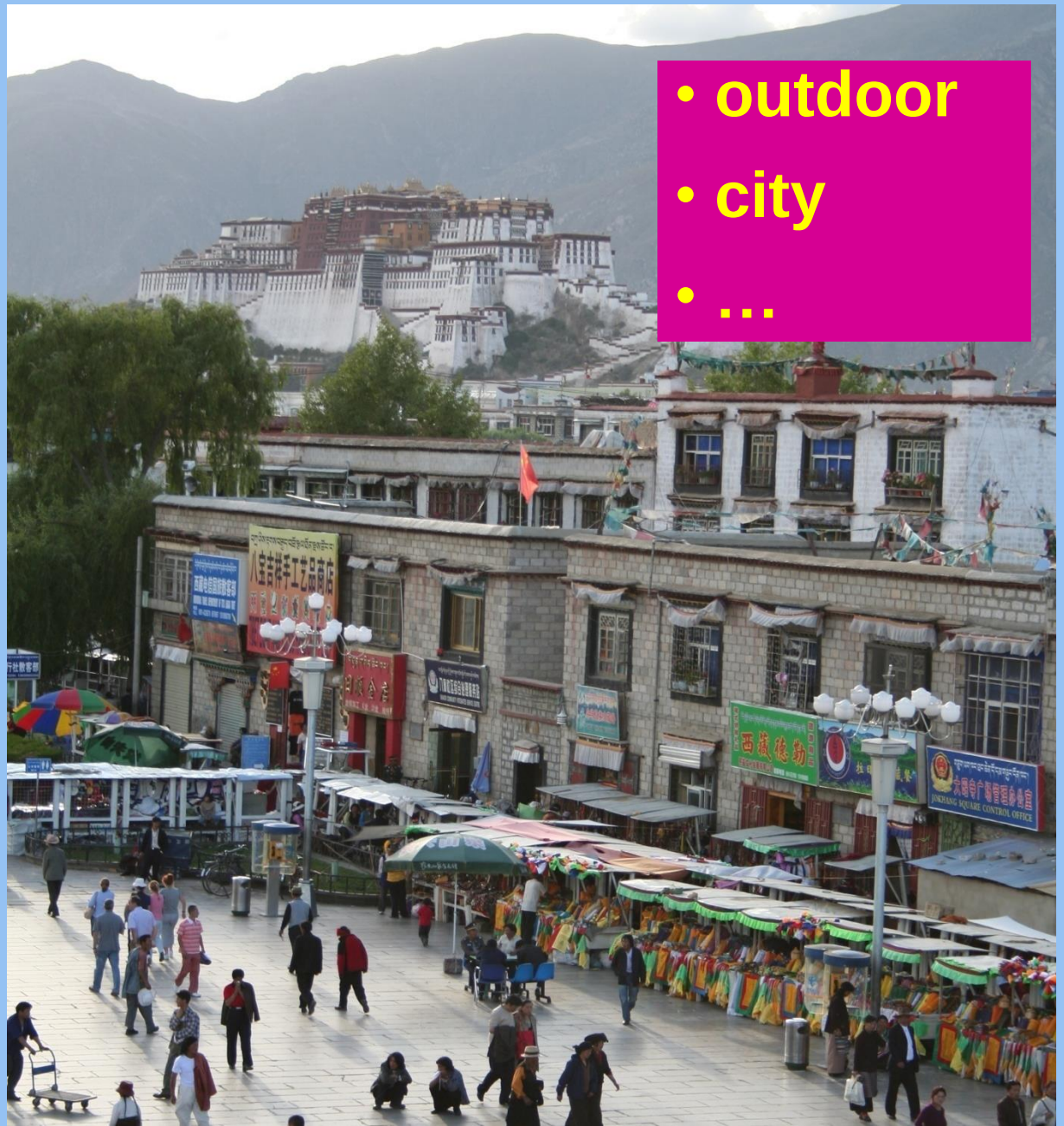
Verification: is that a lamp?

Detection: are there people?

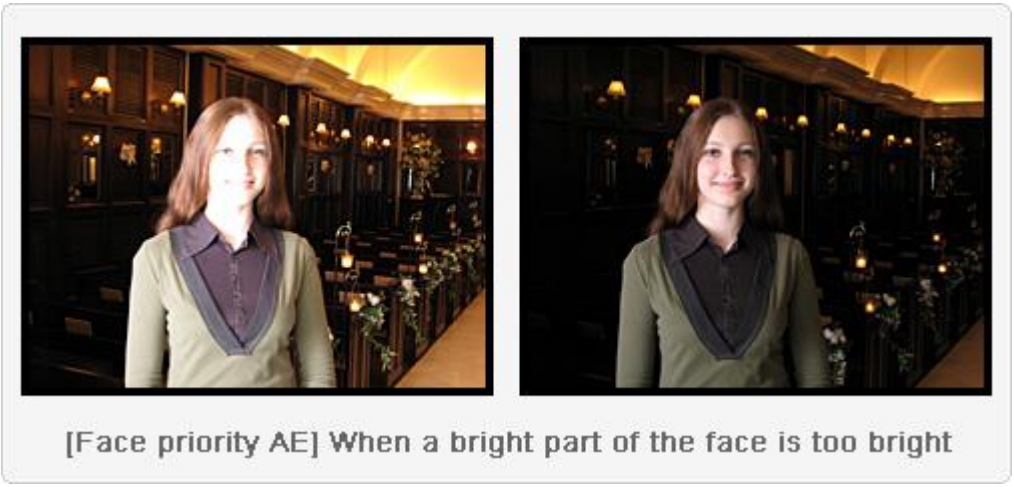
Identification: is that Potala Palace?

Object categorization

Scene and context categorization



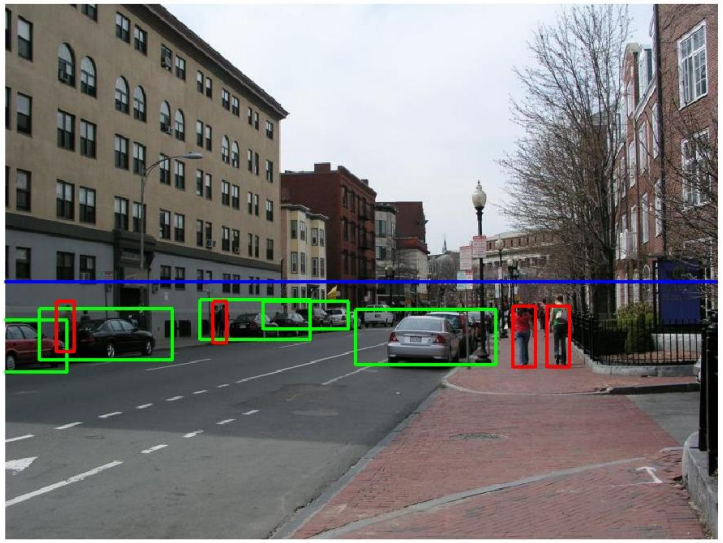
Computational photography

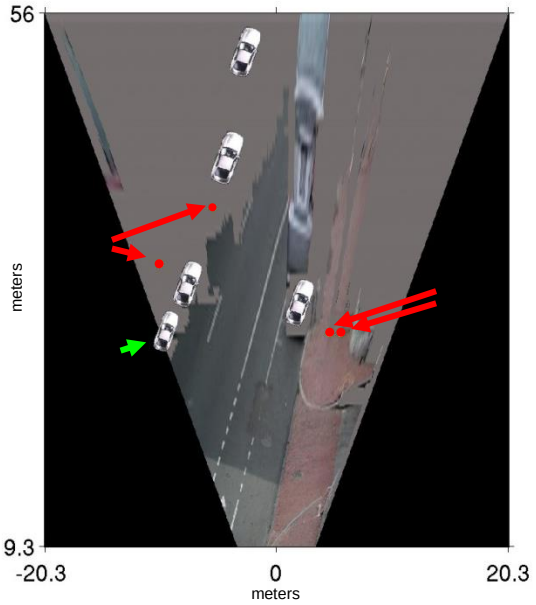


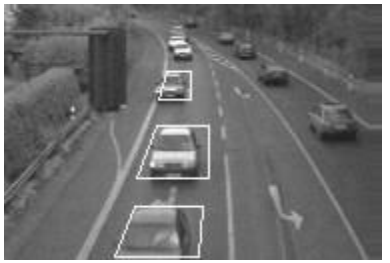
[Face priority AE] When a bright part of the face is too bright

Assisted driving

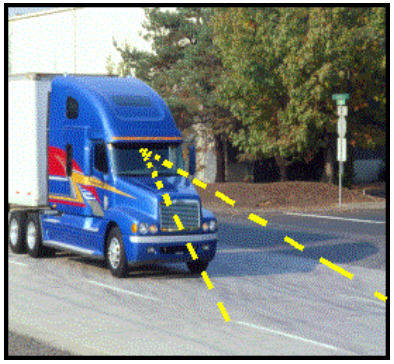
Pedestrian and car detection







Lane detection



- Collision warning systems with adaptive cruise control,
- Lane departure warning systems,
- Rear object detection systems,

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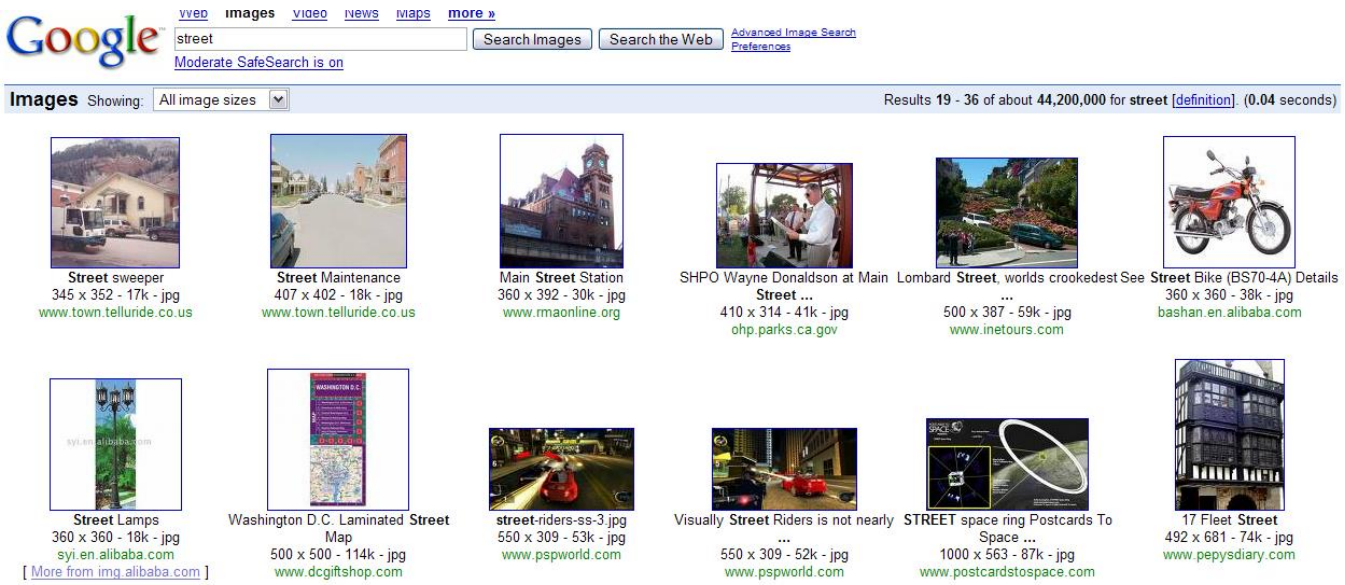
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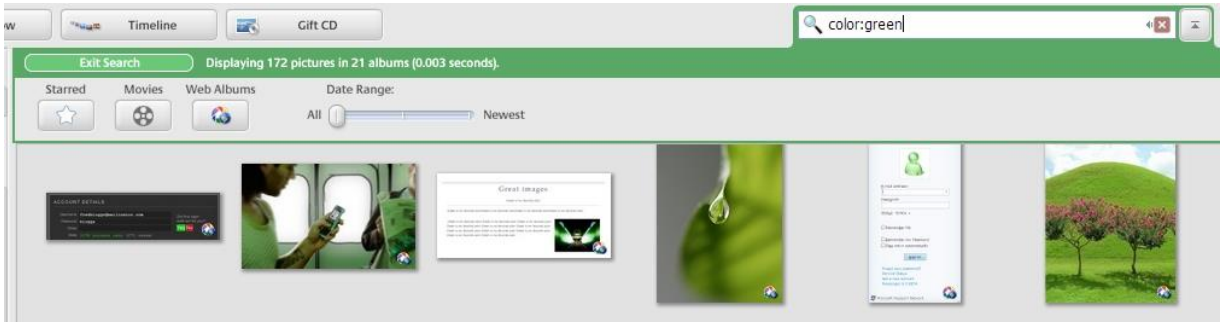
Organizing photo collections



Challenges in Object Recognition

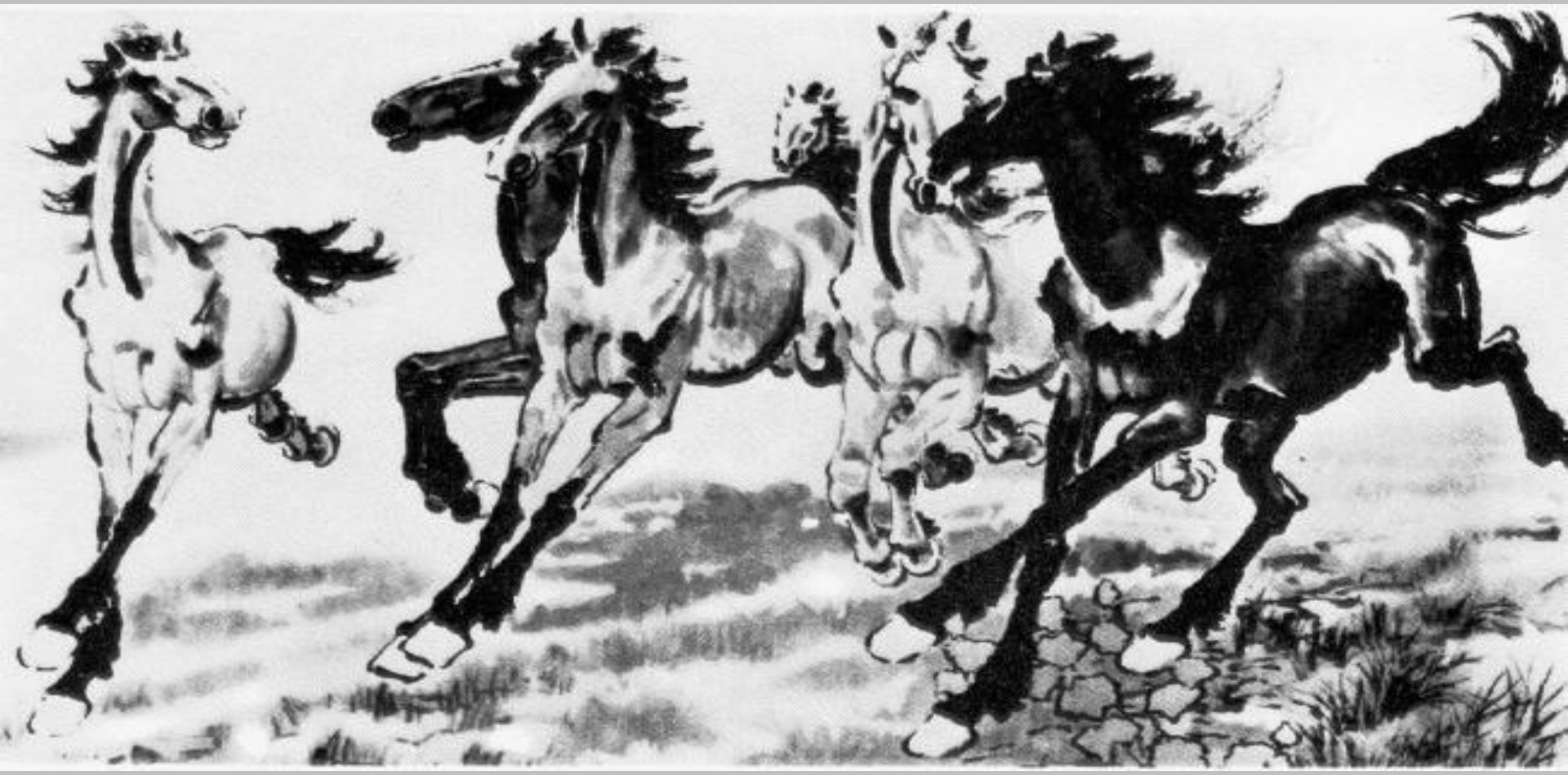
Challenge # 1: view point variation

Challenge # 2: illumination

Challenge # 4: scale

Challenge # 3: occlusion

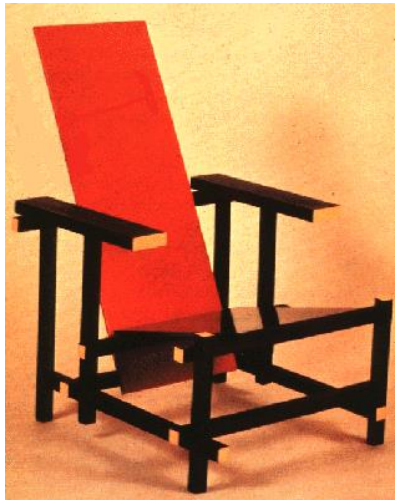
Challenge # 5: deformation



Challenge # 6: background clutter

Single object dectection

Challenge # 7: intra-class variation



Useful Links

- Computers can see. Now what? | Joseph Redmon | TEDxGateway